

1           1.       A method, comprising:  
2               providing digital information including global digital information  
3       indicative of a common reference and local digital information indicative of an optical  
4       output from at least one display element; and  
5               determining a transition separating a first pulse interval and a second pulse  
6       interval in a modulated signal based on the digital information.

1           2.       The method of claim 1, including driving said at least one display element  
2       from the modulated signal to provide the optical output based on said digital information.

1           3.       The method of claim 2, including:  
2               storing said digital information at said at least one display element;  
3               deriving the timing of said transition to indicate the lengths of said first  
4       and second pulse intervals forming the modulated signal based on said digital  
5       information; and  
6               controlling the optical output of the at least one display element based on  
7       said lengths of said first and second pulse intervals of the modulated signal within a  
8       refresh period.

1           4.       The method of claim 3, wherein providing said local digital information  
2       including:  
3               dynamically receiving video data associated with the at least one display  
4       element ; and  
5               causing a duration of illumination within said refresh period for the at least  
6       one display element based on the length of the first pulse interval of the modulated signal.

1           5.       The method of claim 4, wherein receiving said video data includes  
2       programmably receiving at least one pixel value corresponding to the at least one display  
3       element.

1           6.       The method of claim 3, including:  
2                    programmably storing said digital information in at least one register  
3       associated with the at least one display element;  
4                    varying a duration of application of the modulated signal to the at least  
5       one display element based on said digital information;  
6                    selectively adjusting the optical output based on said duration of  
7       application of the modulated signal to compensate for a display nonlinearity for the at  
8       least one display element; and  
9                    selectively delaying said transition based on said digital information to  
10       nonlinearly modulate the optical output from the at least one display element.

1           7.       The method of claim 3, including:  
2                    receiving said global and local digital information;  
3                    using said global and local digital information to determine the lengths of  
4       said first and second pulse intervals; and  
5                    causing said transition in the modulated signal to the at least one display  
6       element based on the lengths of said first and second pulse intervals.

1           8.       The method of claim 3, wherein providing digital information includes  
2       sending at least one pixel value to said at least one display element and said method  
3       further including:

4 receiving said at least one pixel value to store in at least one register at  
5 said at least one display element;  
6 sending a start signal to said at least one display element;  
7 in response to the start signal at said at least one display element, initiating  
8 the modulated signal to drive said at least one display element;  
9 incrementing a count and reporting the count to said at least one display  
10 element;  
11 in response to said count at said at least one register of said at least one  
12 display element, comparing said at least one pixel value to said count to determine the  
13 timing of the transition; and  
14 causing said transition in the modulated signal for the at least one display  
15 element based on the timing of said transition.

1 9. The method of claim 1, including causing said transition from an "ON"  
2 logic state to an "OFF" logic state in the modulated signal when said global and local  
3 digital information meet a first predefined criterion.

1 10. The method of claim 9, including causing said transition from an "OFF"  
2 logic state to an "ON" logic state in the modulated signal when said global and local  
3 digital information meet a second predefined criterion being substantially opposite that  
4 the first predefined criterion.

1 11. An apparatus, comprising:  
2 at least one display element;

3 a controller to provide digital information including global digital  
4 information indicative of a common reference and local digital information indicative of  
5 an optical output from the at least one display element; and  
6 a signal generator associated with the at least one display element  
7 operably coupled to said controller to receive the digital information and to determine a  
8 transition separating a first pulse interval and a second pulse interval in a modulated  
9 signal based on the digital information.

1 12. The apparatus of claim 11, wherein said signal generator to drive the at  
2 least one display element from the modulated signal to provide the optical output based  
3 on a comparison of the global and local digital information.

1 13. The apparatus of claim 12, further comprising:  
2 a pixel source operably coupled to the signal generator to receive said  
3 digital information, said signal generator to:  
4 derive the timing of said transition to indicate the lengths of said  
5 first and second pulse intervals forming the modulated signal based on said digital  
6 information; and  
7 control the optical output for the at least one display element based  
8 on said lengths of said first and second pulse intervals of the modulated signal within a  
9 refresh period.

1 14. The apparatus of claim 13, wherein said pixel source dynamically receives  
2 video data associated with the at least one display element to cause a duration of  
3 illumination within said refresh period for the at least one display element based on the  
4 length of the first pulse interval of the modulated signal.

1           15.    The apparatus of claim 13, wherein said at least one display element  
2 includes a plurality of display elements forming an array of display elements in a liquid  
3 crystal display.

1           16.    The apparatus of claim 15, wherein said liquid crystal display includes a  
2 spatial light modulator.

1           17.    The apparatus of claim 13, wherein said controller includes:  
2                   a control logic to controllably operate the at least one display element  
3 based on said digital information; and  
4                   a counter to provide global digital information indicative of a dynamically  
5 changing common reference for said at least one display element.

1           18.    The apparatus of claim 17, wherein said signal generator includes a device  
2 to use said global digital information with said local digital information to provide said  
3 transition in the modulated signal driving the at least one display element.

1           19.    The apparatus of claim 18, wherein said each signal generator includes an  
2 associated pulse width modulator to form said modulated signal based on said transition,  
3 said associated pulse width modulator to:  
4                   programmably receive said digital information including video data  
5 including a pixel value;  
6                   store said pixel value;  
7                   selectively delay the transition based on said pixel value; and

8                   cause the transition in said modulated signal from a first logic state to a  
9                   second logic state to nonlinearly modulate the optical output from the at least one display  
10                  element.

1                  20.     The apparatus of claim 19, wherein said pixel source includes at least one  
2                  register to store said pixel value.

1                  21.     A processor-based system, comprising:  
2                          a pixel array including a first and second pixel;  
3                          at least two first circuits, each associated with a different pixel of said  
4                  pixel array; and  
5                          a second circuit to supply digital information including global digital  
6                  information indicative of a common reference and local digital information indicative of  
7                  a pixel output to each first circuit to determine a transition separating a first pulse interval  
8                  and a second pulse interval in a modulated signal based on the digital information.

1                  22.     The processor-based system of claim 21, wherein said each first circuit of  
2                  the at least two first circuits comprising:  
3                          a waveform forming device to generate the modulated signal through  
4                  pulse-width modulation that drives said different pixel of the pixel array causing the pixel  
5                  output based on a comparison of the global and local digital information.

1                  23.     The processor-based system of claim 22, wherein said each first circuit of  
2                  the at least two first circuits further comprising:  
3                          a digital pixel source operably coupled to the waveform forming device to  
4                  receive said digital information, said each first circuit to:

5                   derive the timing of the transition to indicate the lengths of said  
6 first and second pulse intervals based on said digital information; and  
7                   control the pixel output from a pixel of the pixel array based on the  
8 modulated signal within a refresh period.

1           24.     The processor-based system of claim 23, wherein said each digital pixel  
2 source to dynamically receive corresponding video data associated with a pixel to cause a  
3 duration of illumination for said pixel based on the length of the first pulse interval of the  
4 modulated signal within said refresh period.

1           25.     The processor-based system of claim 23, wherein said pixel array includes  
2 a liquid crystal display.

1           26.     The processor-based system of claim 25, wherein said liquid crystal  
2 display includes a spatial light modulator.

1           27.     The processor-based system of claim 23, wherein said second circuit  
2 includes:  
3                   a control logic to controllably operate each pixel of said pixel array based  
4 on said digital information; and  
5                   a counter to provide a count in said common reference of said global  
6 digital information.

1           28.     The processor-based system of claim 27, wherein said each first circuit of  
2 the at least two first circuits includes a device to use said local digital information with

3 the global digital information to provide the transition in the modulated signal for an  
4 associated pixel of said pixel array.

1 29. The processor-based system of claim 28, wherein said each first circuit of  
2 the at least two first circuits to:

3 programmably receive said video data including at least one pixel value  
4 associated with the associated pixel of said pixel array;  
5 store said each pixel value;  
6 selectively delay the transition based on said each pixel value; and  
7 cause the transition in said modulated signal from a first logic state to a  
8 second logic state to nonlinearly modulate the pixel output of the associated pixel of said  
9 pixel array.

1 30. The processor-based system of claim 23, wherein said each digital pixel  
2 source includes at least one register to store said digital information associated with a  
3 pixel of said pixel array.